REMARKS

Claim Rejections under 35 U.S.C. § 103

Reconsideration of the rejection of claims 1-18, 20-31, and 33-40 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. (U.S. Patent No. 6,759,647 B2) in view of a Matsuura (U.S. Patent No. 5,604,345) and further in view of Ogawa (U.S. Patent No. 5,499,098) is respectfully requested.

Claim 1

Reconsideration of the rejection of claim 1 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 1 is directed to a pointing system comprising:

> an encoded surface; and
> a pointing device for use with the encoded surface wherein said **device is remote from said encoded surface during pointing**, said pointing device comprising:
> a collimated light source for projecting a collimated light beam having a wavelength outside the visible light spectrum onto said encoded surface, said encoded surface scattering the collimated light beam striking said encoded surface;
> a detector associated with the collimated light source for detecting at least a portion of said scattered light; and
> a controller associated with the detector and configured to respond to the detected portion of the scattered light to determine a position where the collimated light beam strikes the encoded surface, said position corresponding to where the device is pointing.[1]

None of the references, taken individually or in combination, discloses or suggests these novel elements.

None of the references discloses a pointing device for use with an encoded surface wherein the **device is remote from the encoded surface during pointing.** During such pointing, the remote, encoded surface scatters light projected from the pointing device back to the device for detection by the detector. Applicants' disclosure explains the importance of the

[1] (emphasis added).

remoteness of the device from the encoded surface. Applicants explain that known pen-shaped devices utilized for handwriting recognition include a patterned surface and a light source positioned against or a short distance from the patterned surface.[2] Such known devices are not useful for remote pointing. Applicants continue to explain that such remote pointing devices are "useful for off-desk navigation, large displays, presentations, collaborations, and home-based screens . . . ."[3] Such applications clearly contemplate a pointing device remote from an encoded surface, rather than one utilized at a short distance from an encoded surface, as with the known pen-shaped devices discussed previously. Again, none of the references discloses a pointing device remote from the encoded surface during pointing.

In particular, Ito et al. disclose a miniature, compact projection encoder for positional detection. The focus of the Ito et al. disclosure is the compactness of the projection encoder. For example, Ito et al. state that

> [t]he present invention relates to a projection encoder based on a triple-grating concept involving the use of a **semiconductor substrate** or other type of substrate with transmission gratings and photodetectors, and more particularly to a **miniature, compactly structured projection encoder** capable of accurately generating a home position signal for positional detection.[4]

Ito et al. continue by stating that "**[a]nother object of the present invention is to provide a projection encoder that has a small-sized** home position detection mechanism, **is compactly structured**, and is based on the triple-grating concept."[5] Similarly, Ito et al. state that "[i]t is also possible to construct a **compact, miniature projection encoder** that has home position detection functionality."[6] In no uncertain terms, Ito et al. plainly teach that the "projection encoder" is compactly structured. Thus, the components of the projection encoder must also be formed compactly.

When defining the components of the projection encoder, Ito et al. state that "the projection linear encoder 1 **essentially comprises an LED, halogen lamp, or other light source 2; a movable grating plate 6** comprising a semiconductor substrate on which a transmission grating group 3 and photodiode groups 4 and 5 are integrally formed; **a reflecting grating plate (fixed grating plate)** 9 in which reflecting grating groups 7 and 8 are formed on the surface; **and**

---

[2] As-filed Application, paragraph [0005].
[3] *Id.* at paragraph [0032].
[4] U.S. Patent No. 6,759,647, column 1, lines 14-20 (emphasis added).
[5] *Id.* at column 2, lines 50-53 (emphasis added).
[6] *Id.* at column 9, lines 22-24 (emphasis added).

a control circuit unit 10."[7] Ito et al. state that the light source, the movable grating plate, the reflecting grating plate, and the control circuit unit are "**essential**" components of the projection linear encoder. Because Ito et al. teach that these components must also cooperate to form a compact and miniaturized encoder, Ito et el. do not teach or suggest that any components of the encoder can be "remote" from one another, in particular the reflecting grating plate from the light source and movable grating plate. Beyond failing to teach remoteness of the pointing device, Ito et al. actually teach away from the claimed invention, as they clearly set forth the object of creating a "miniature, compactly structured projection encoder," in direct opposition to the requirement of claim 1 that the pointing device be remote from the encoded surface during pointing.

> Ito et al. further teach away from the present invention in stating that
>
> the transmission gratings and photodetectors . . . are fabricated using semiconductor manufacturing technology, making it possible to manufacture fine-pitch gratings and to obtain high-resolution encoders. In addition, the photodetectors formed as vertical stripes at a constant pitch function as a grating, and the grating itself has a lens effect, so an optical lens system can be dispensed with and the device can be **miniaturized**.[8]

Dispensing with an optical lens system and noting that the gratings themselves are small enough to act as lenses further teaches one skilled in the art that the distances between the movable grating plate and the reflecting grating plate must be tiny for the entire device to be "miniaturized." Again, teaching one skilled in the art to create such a compact and miniature device would teach away from Applicants invention, in particular the remoteness of the pointing device from the encoded surface.

Matsuura similarly fails to teach or suggest such a pointing device remote from the light-scattering encoded surface. For example, Matsuura discloses a linear encoder with transmitting and non-transmitting grating portions having widths of less than 20 μm (800 microinches).[9] To make such grating widths effective, the light source, gratings, and detectors cannot be remote from one another. Such narrow gratings would not be effective at remote distances. The figures of Matsuura further demonstrate this fact. For example, the linear encoder of Fig. 8 includes a light source, a uniform grating main scale, and detecting devices in close proximity to one another.

---

[7] *Id.* at column 4, lines 55-62 (emphasis added).
[8] *Id.* at column 1, line 65 to column 2, line 6 (emphasis added).
[9] U.S. Patent No. 5,604,345, column 4, lines 19-49.

Ogawa similarly fails to teach or suggest a pointing device remote from an encoded surface for scattering light, as Ogawa fails to teach an encoded surface for scattering light. Instead, Ogawa describes a transparent member 4, 24, 34 or a slit 14 for allowing light to pass through to a detector. The Ogawa reference thus provides no teaching related to the scattering of light from an encoded surface.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claims 2-24, which depend directly or indirectly from claim 1, are submitted as patentable for the same reasons as set forth above in claim 1.

Claim 4

Reconsideration of the rejection of claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 4 requires a pointing system wherein the encoded surface scatters only infrared light. The Office claims that the combination of the encoded surface with scattering features of Ito et al. and the infrared LED of Ogawa would teach one skilled in the art to provide an encoded surface that scatters only infrared light.[10] Applicants strongly disagree. Ito et al.'s disclosure of an encoded surface with features capable of scattering visible light provides no teaching or suggestion regarding the construction of an encoded surface with features capable of scattering some light wavelengths (e.g., infrared), while excluding the scattering of other light wavelengths (e.g., visible). Moreover, the teaching of an infrared LED of Ogawa provides nothing more than a basic reference to other wavelengths of light, which would certainly be known to one skilled in the art. But the mere knowledge of LEDs capable of producing different wavelengths of light provides no relevant teaching or suggestion for constructing a surface that scatters only a particular type of light. This omission in teaching is significant, and Applicants strongly disagree that one skilled in the art would combine these teachings to reach the features of claim 4.

[10] June 27, 2006, Office action, page 3, line 28 to page 4, line 6.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 4. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim 5

Reconsideration of the rejection of claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 5 requires a pointing system wherein the encoded surface comprises at least one scattering feature that substantially scatters infrared light and at least one non-scattering feature that does not substantially scatter infrared light. As with claim 4, the Office again provides no reference that teaches construction of an encoded surface with features capable of scattering infrared light wavelengths. Moreover, the Office's reference to the infrared LED of Ogawa is not helpful to one skilled in the art, because Ogawa does not teach or suggest anything regarding **scattering** of infrared light. Without more relevant teaching, the present rejection of claim 5 cannot be maintained, as there is no teaching or suggestion for an infrared scattering feature.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 5. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claims 6 and 7, which depend directly from claim 5, are submitted as patentable for the same reasons as claim 5.

Claim 7

Reconsideration of the rejection of claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 7 requires a pointing system wherein at least one scattering feature is an infrared coating. Again, the Office relies upon Ogawa's description of an infrared LED to provide the relevant teaching to one skilled in the art for the construction of a scattering feature that is an infrared coating. Applicants contend that the step from a mere infrared LED to an infrared coating is simply too far. Ogawa provides no such infrared coating and the mere inclusion of an

infrared LED is not sufficient to encourage an inventive mind to move in the direction of such an infrared coating. Here, the Office fails to fulfill its duty to cite a reference with teaching relevant to the features of claim 7. Applicants respectfully request that the Office cite a specific reference that describes such features in detail sufficient to make a *prima facie* case of obviousness.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 7. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claims 10 and 11

Reconsideration of the rejection of claims 10 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 10 requires a pointing system wherein the device is at least 15 centimeters (6 inches) from the encoded surface. As discussed with respect to claim 1, the cited references teach away from such a pointing system. Ito et al. disclose a miniature, compact projection encoder that does not include a pointing device at least 15 centimeters (6 inches) from the encoded surface. Rather, Ito et al. disclose a projection encoder constructed on a much smaller scale, including gratings formed on semiconductor substrates. Matsuura and Ogawa similarly provide no teaching or suggestion for a light-scattering encoding surface, as discussed more generally above with respect to claim 1.

Claim 11 discloses a pointing system wherein the device is at least 90 centimeters (3 feet) from the encoded surface. Again, the cited references teach away from such a pointing system, as discussed above with respect to claims 1 and 10.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 10 and 11. If the Office maintains the rejection of the present claims, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim 16

Reconsideration of the rejection of claim 16 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 16 requires a pointing surface wherein the encoded surface is incorporated into a display. In other words, the encoded surface must be made part of the display. As explained in the application,

> For example, the encoded surface may be incorporated into a display 41 (e.g., a cathode ray tube (CRT), a liquid crystal display (LCD), an organic light-emitting diode (OLED) display, a projected image, or a plasma display panel (PDP), etc.), a screen, a whiteboard, a wall, an appliance, or any other surface, thereby encoding the surface for interaction with the device 25 and likely a networked computer. For example, a networked microwave oven may include an encoded surface 23 over a series of activation areas, or buttons, of the microwave. Thus, the microwave may be used customarily without use of the encoded surface 23. In addition, however, by pointing the collimated light beam C of the device 25 at an activation area, the detector 31 can detect the scattered light, indicating that the particular activation area of interest should be activated, and send a command corresponding to the activation area on the Microwave via a personal computer.[11]

With the encoded surface incorporated into the display, the encoded features of the encoded surface may be readily associated with the visual features of the display, thereby providing a ready way of associating the location of the scattered light beam with the display. In this manner the device may readily be used as a pointing device.

The Office states that "Ito discloses wherein said encoded surface is incorporated into a display."[12] The portion of Ito et al. referred to by the Office does not teach an encoded surface incorporated into a display, but rather teaches a display unit 13 for displaying calculation results from the calculation of the encoder device. This display simply shows the result of the encoder, and there is no encoded surface incorporated into this display. The grating plates of Ito et al. are not incorporated into the display. Thus, there is no correspondence between the display and the encoded surface, as contemplated by Applicants.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 16. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claims 17-19, which depend directly or indirectly from claim 16, are also submitted as patentable for the same reasons as set forth above with respect to claim 16.

---

[11] As-filed Application, paragraph [0022].
[12] June 27, 2006, Office action, page 5, lines 26-28.

Claim 23

Reconsideration of the rejection of claim 23 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 23 requires a pointing system wherein the device further comprises a visible light source for projecting a visible light beam onto the encoded surface in substantially the same position on the encoded surface where the collimated light beam strikes the encoded surface. As explained in the application:

> Because the collimated light beam C is not within the visible spectrum, a user may have difficulty determining exactly where the device 25 is pointed. This is particularly true where the encoded surface 23 is incorporated with a surface not capable of imaging a cursor, such as a large screen or wall with an encoded surface. In these situations, having visible light beam V aids the user in aiming the pointing device 25 to the desired location.[13]

The portions of the cited art referenced by the Office do not teach or suggest using such a visible light beam in combination with the collimated light beam. For example, Ito et al. teach a visible light source and Matsuura teaches a collimated light source, but there is no teaching or suggestion in either reference, in the prior art generally, or in the knowledge of one skilled in the art to add a visible light beam to the collimated light beam. The mere presence of one of each type of light in separate prior art references is not sufficient to teach one skilled in the art to both combine such light sources with one another and coordinate their orientation in a single device.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 23. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim 24

Reconsideration of the rejection of claim 24 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 24 further comprises a second collimated light source for projecting a second collimated light beam onto the encoded surface, the encoded surface scattering the second collimated light beam striking the encoded surface, and a second detector associated with the

[13] As-filed application, paragraph [0029].

second collimated light source for detecting at least a portion of the scattered light. The Office cites no reference that teaches the use of a second collimated light source and a second detector. The Office maintains that it would have been obvious to one skilled in the art to have two different light sources. But such an interpretation ignores the more clear and straightforward teaching of the cited prior art for a more compact and miniaturized device, as a device with additional detectors and light sources would necessarily increase complexity and may increase the size of the device. In other words, the knowledge attributed to one skilled in the art is in contrast to what the prior art references cited by the Examiner teach. As such, Applicants assert that the Office's reliance upon the knowledge of one skilled in the art that contravenes the clear teaching of the cited art is improper.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 24. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim 25

Reconsideration of the rejection of claim 25 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Among other things, claim 25 requires a pointing device for use with an encoded surface when the pointing device is remote from the encoded surface. Applicants submit claim 25 as patentable for the same reasons as set forth above with respect to claim 1. Applicants respectfully request reconsideration and withdrawal of the rejection of claim 25. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claims 26-37, which depend directly or indirectly from claim 25, are submitted as patentable for the same reasons as set forth above in claim 25.

Claim 30

Reconsideration of the rejection of claim 30 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 30 requires an encoded surface incorporated into a display and that the controller signal the display to display an image corresponding to the position where the collimated light beam strikes the encoded surface. Applicants submit claim 30 as patentable for the same reasons as set forth above with respect to claims 16 and 17. Applicants respectfully request reconsideration and withdrawal of the rejection of claim 30. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claims 31 and 32, which depend directly or indirectly from claim 30, are submitted as patentable for the same reasons as set forth above in claim 30.

Claim 33

Reconsideration of the rejection of claim 33 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 33 requires a visible light source for projecting a visible light beam onto the encoded surface in substantially the same position on the encoded surface where the collimated light beam strikes the encoded surface. Applicants submit claim 33 as patentable for the same reasons as set forth above with respect to claim 23. Applicants respectfully request reconsideration and withdrawal of the rejection of claim 33. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim 34

Reconsideration of the rejection of claim 34 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 34 requires a second collimated light source and a second detector, generally as set forth above with respect to claim 24. Applicants submit claim 34 as patentable for the same reasons as set forth above with respect to claim 24. Applicants respectfully request reconsideration and withdrawal of the rejection of claim 34. If the Office maintains the rejection

of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim 38

Reconsideration of the rejection of claim 38 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Among other things, claim 38 defines a method for determining a position where a collimated light beam of a pointing device strikes an encoded surface remote from the pointing device. Applicants submit claim 38 as patentable for the same reasons as set forth above with respect to claim 1. Applicants respectfully request reconsideration and withdrawal of the rejection of claim 38. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claims 39 and 40, which depend directly from claim 38, are submitted as patentable for the same reasons as set forth above with respect to claim 38.

Claim 40

Reconsideration of the rejection of claim 40 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of a Matsuura and further in view of Ogawa is respectfully requested.

Claim 40 requires a method for utilizing the position information to execute a command on a computer associated with the pointing device, the command corresponding to an item on a display associated with the encoded surface, the item corresponding to the position where the collimated light beam strikes the encoded surface. In other words, a user may direct the collimated light beam to point to an item on the encoded surface in order to execute a computer command corresponding to the item. For example, a user may point to an icon on the encoded surface representing a particular application to initiate execution of the application.

The Office contends that Ito et al. teach such a method, yet the cited portions of the Ito et al. reference fail to provide any relevant teaching in this regard. Rather, the cited portions discuss the calculation and display of travel information related to the encoder. As the encoder moves, an arithmetic unit calculates its speed, direction, and position, and a display unit displays

the results. Ito et al. teach nothing to one skilled in the art regarding using position information related to an item on the encoded surface to execute a computer command. Ito et al. merely teach that the collected information may be used to determine position. What is done with such position information is not treated in Ito et al.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 40. If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

CONCLUSION

In view of the foregoing, favorable reconsideration and allowance of this application is requested.

Applicants have reviewed the cited but unapplied references and have found them to be no more pertinent than the art discussed above.

The Applicants wish to expedite prosecution of this application. If the Examiner deems the claims not in condition for allowance, the Examiner is invited and encouraged to telephone the undersigned to discuss making an Examiner's amendment to place the claims in condition for allowance.

Applicants do not believe that a fee is due. But if the Commissioner determines otherwise, he is authorized to charge Deposit Account No. 19-1345.

Respectfully submitted,

Brian P. Klein, Reg. No. 44,837
SENNIGER POWERS
One Metropolitan Square, 16th Floor
St. Louis, Missouri 63102
(314) 231-5400

BPK/dss